

Amendments to the Drawings:

The drawing sheets attached in connection with the above-identified application containing Figures 5c, 6, and 7 are being presented as a new formal drawing sheets to be substituted for the previously submitted drawing sheets. The drawing Figure 6 has been amended. Appended to this amendment is an annotated copy of the previous drawing sheet which has been marked to show changes presented in the replacement sheet of the drawing.

The specific changes which have been made to Figure 6 is to add reference numeral "60."

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

The specification has been amended on pages 1, 2, 5, and 13.

Claims 10 and 22 have been canceled.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-9 and 11-21 are now pending in this application.

Objection to the Drawings

The drawings are objected to for containing informalities. Applicant respectfully submits that the amendment to the drawing renders this objection moot. Reconsideration and withdrawal of this objection is respectfully requested.

Objections to the Specification

The specification is objected to for containing informalities. Applicant respectfully submits that the amendments to the specification render these objections moot. Reconsideration and withdrawal of these objection is respectfully requested.

Objection to the Claims

Claims 1-19, 21, and 22 are objected to for containing informalities. Applicant respectfully submits that the amendments to the claims render this objection moot. Reconsideration and withdrawal of this objection is respectfully requested.

Rejections under 35 U.S.C. § 101 and 112

Claim 22 is rejected under 35 U.S.C. § 101 and under 35 U.S.C. § 112, second paragraph. Claim 22 has been canceled. Withdrawal of these rejections is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 1, 2, 4, 8, and 13-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,232,010 to Cisar *et al.* (hereafter “Cisar”) in view of U.S. Patent No. 6,022,634 to Ramunni *et al.* (hereafter “Ramunni”). This rejection is respectfully traversed.

Amended claim 1 recites a stack, to be used in a fuel cell or electrolyzer, comprising a collector layer, said collector layer being a metal foil or metal plate, at least one anchoring layer, said anchoring layer comprising metal fibers, said anchoring layer having a thickness of less than 0.5 mm, at least one diffusion layer, said diffusion layer being a metal mesh or expanded metal sheet or a sheet of foamed metal, wherein said anchoring layer is provided between said collector layer and said diffusion layer, wherein said collector layer, anchoring layer and diffusion layer are sintered to each other, and at least one contact layer sintered to a side of said diffusion layer which is not connected to said anchoring layer, wherein said contact layer comprises metal fibers. Claims 2, 4, 8, and 13-22 depend from claim 1.

Cisar discloses a barrier and flow control device for an electrochemical reactor that includes a flow field 102, a gas diffusion or distribution layer 104, a membrane 106, a separator 112, and electrodes 108, 109. See col. 8, line 66, to col. 9, line 44; Figures 13 and 15. Cisar discloses that the flow field 102 can be made from metal foam, expanded metal sheet, or sintered metal particles or sintered metal fibers, and that the gas distribution layer 104 can be made from sintered metal particles or sintered metal fibers. See col. 5, lines 2-6, of Cisar. Cisar further discloses that the flow field 102 and the gas distribution layer 104 are metallurgically bonded, such as by sintering. See col. 4, lines 55-59; col. 5, lines 6-9, of Cisar. On page 5 of the Office Action the Office identifies the separator 112 as a collector

layer, the gas distribution layer 104 as a diffusion layer, and the flow field 102 as an anchoring layer.

However, because Cisar discloses that the gas distribution layer 104 can be made from sintered metal particles or sintered metal fibers, the gas distribution layer 104 cannot be a diffusion layer made of a metal mesh or expanded metal sheet or a sheet of foamed metal, as recited in amended claim 1. Therefore, the flow field 102 of Cisar would have to serve as a diffusion layer, as recited in amended claim 1.

Ramunni discloses an electrochemical cell that includes a plate 1, a distributor 2, a current collector 3, a gasket 4, a gas diffusion electrode 5, and a membrane 6. See col. 4, lines 18-23, and Figure 1 of Ramunni. Ramunni discloses that the collector 3 can be made of a metal gauze and that the gas distributor 2 can be made of a metal foam. See col. 3, lines 46-51, and col. 4, lines 32-48, of Ramunni.

However, neither Cisar nor Ramunni disclose or suggest a contact layer, as recited in amended claim 1. Therefore, the combination of Cisar and Ramunni does not render claim 1 obvious because this combination fails to disclose or suggest all of the features recited in claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

Claim 3

Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Cisar and Ramunni, as applied to claim 1. Claim 3 depends from claim 1 and is therefore allowable over the combination of Cisar and Ramunni because this combination fails to disclose or suggest all of the features of claim 1, as discussed above. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 5 and 6

Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cisar and Ramunni, as applied to claim 1, and further in view of U.S. Patent No. 5,441,822 to Yamashita *et al.* (hereafter “Yamashita”). This rejection is respectfully traversed. Yamashita fails to remedy the deficiencies of Cisar and Ramunni discussed above in regard to

independent claim 1, from which claims 5 and 6 depend. Reconsideration and withdrawal of this rejection is respectfully requested.

Claim 7

Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Cisar and Ramunni, as applied to claim 1, and further in view of U.S. Patent No. 5,482,792 to Faita *et al.* (hereafter “Faita”). This rejection is respectfully traversed. Faita fails to remedy the deficiencies of Cisar and Ramunni discussed above in regard to independent claim 1, from which claim 7 depends. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 10 and 12

Claims 10 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cisar and Ramunni, as applied to claim 1, and further in view of U.S. Patent No. 6,613,468 to Simpkins *et al.* (hereafter “Simpkins”). This rejection is respectfully traversed.

Claim 10 has been canceled and claim 12 depends from claim 1. As discussed above, Cisar and Ramunni fail to disclose all of the features of amended claim 1.

Simpkins discloses a fuel cell that includes a fuel electrode 30, an oxygen electrode 50, and an electrolyte 40 that form an electrochemical cell 10. See col. 2, lines 61-66, and Figure 1 of Simpkins. Simpkins further discloses mats 70, 72 and spacers 60, 62 that can be placed between the electrochemical cell 10 and interconnects 80, 82. See col. 3, lines 10-20, and Figure 2 of Simpkins. Simpkins discloses that the mats 70, 72 can be made of metal and can have a porous structure, such as those provided by wire or fibrous materials, while the spacers 60, 62 can have a planar structure and can be made of ceramics and/or metals. See col. 4, line 40, to col. 5, line 49.

However, none of Cisar, Ramunni, or Simpkins discloses or suggests a collector layer, at least one anchoring layer comprising metal fibers, at least one diffusion layer being a metal mesh or expanded metal sheet or sheet of foamed metal, and at least one contact layer comprising metal fibers, as recited in claim 1. These references, alone or in combination, fail

to disclose three layers in addition to a collector layer, as recited in claim 1, because each of these references at best disclose only two layers in addition to a collector layer.

As discussed above, Cisar only discloses a flow field 102 and a gas diffusion layer 104. Cisar does not disclose or suggest a third layer comprising metal fibers, such as a contact layer or an anchoring layer, as recited in claim 1. The teachings of Ramunni and Simpkins do not remedy the deficiencies of Cisar. Ramunni only discloses a collector 3 that can be made of a metal gauze and a gas distributor 2 that can be made of a metal foam. Simpkins only discloses mats 70, 72 that can be made of metal and can have a porous structure, such as those provided by wire or fibrous materials. Thus, Ramunni and Simpkins also fail to disclose or suggest a third layer comprising metal fibers, such as a contact layer or an anchoring layer, as recited in claim 1.

The Office appears to be taking the disclosure of a single metal fibrous layer, as in Simpkins (mats 70, 72) and Ramunni (a metal gauze collector), as support for adding a third layer comprising metal fibers, such as a contact layer or an anchoring layer, as recited in claim 1. However, the teachings of Simpkins and Ramunni provide no basis for the use of at least three layers, such as an anchoring layer, a diffusion layer, and a contact layer, in addition to a collector layer in a stack because these references only disclose the use of a single metal fibrous layer, not the use of such a layer in addition to a diffusion layer (such as the flow field 102 of Cisar) and a contact layer (or an anchoring layer, depending on whether the gas distribution layer 104 of Cisar is characterized as an anchoring layer or as a contact layer), as recited in claim 1. Nor do Simpkins and Ramunni disclose or suggest modifying a device, such as the device of Cisar, to provide an additional third layer, such as a contact layer or an anchoring layer, as recited in claim 1.

Furthermore, the combination of Cisar, Ramunni, and Simpkins does not disclose or suggest a third layer comprising metal fibers, such as a contact layer or an anchoring layer that is sintered to another layer, as recited in claim 1. The Office argues on page 10 of the Office Action that Cisar provides a general disclosure of sintering layers. However, Cisar only discloses that the flow field 102 and the gas distribution layer 104 are metallurgically bonded, such as by sintering. Cisar fails to disclose or suggest a third layer comprising metal

fibers, such as a contact layer or an anchoring layer, and that such a third layer is sintered to another layer. The teachings of Ramunni and Simpkins fail to remedy this deficiency.

Therefore, the combination of Cisar, Ramunni, and Simpkins fails to disclose or suggest all of the features of amended claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 9 and 11

Claims 9 and 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cisar and Ramunni, as applied to claim 1, and further in view of U.S. Patent No. 4,791,035 to Reichner (hereafter "Reichner"). This rejection is respectfully traversed. Reichner fails to remedy the deficiencies of Cisar and Ramunni discussed above in regard to independent claim 1, from which claims 9 and 11 depend. Reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date

6/23/08

By



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ANNOTATED SHEET
TO SHOW
CHANGES MADE

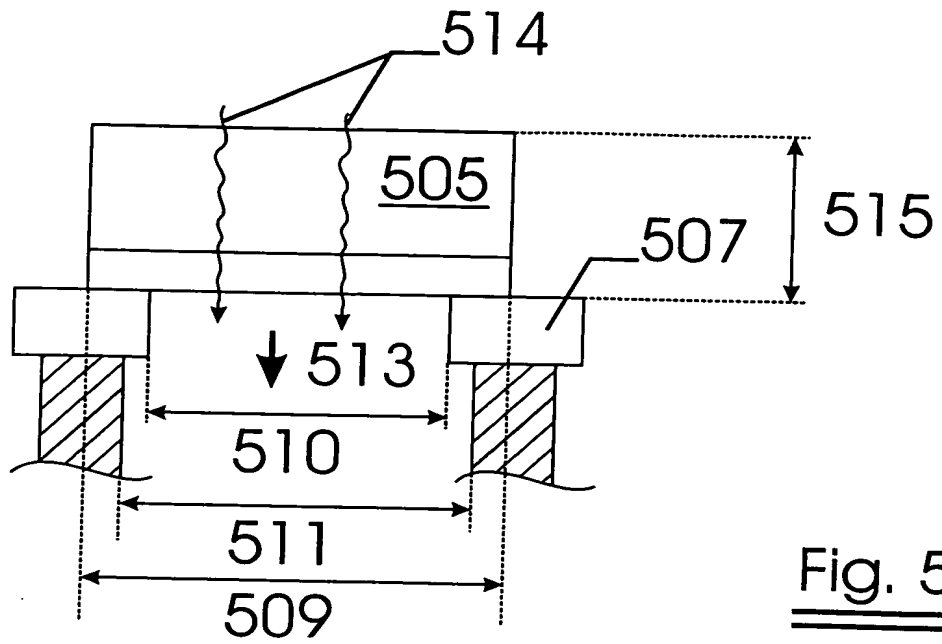


Fig. 5c

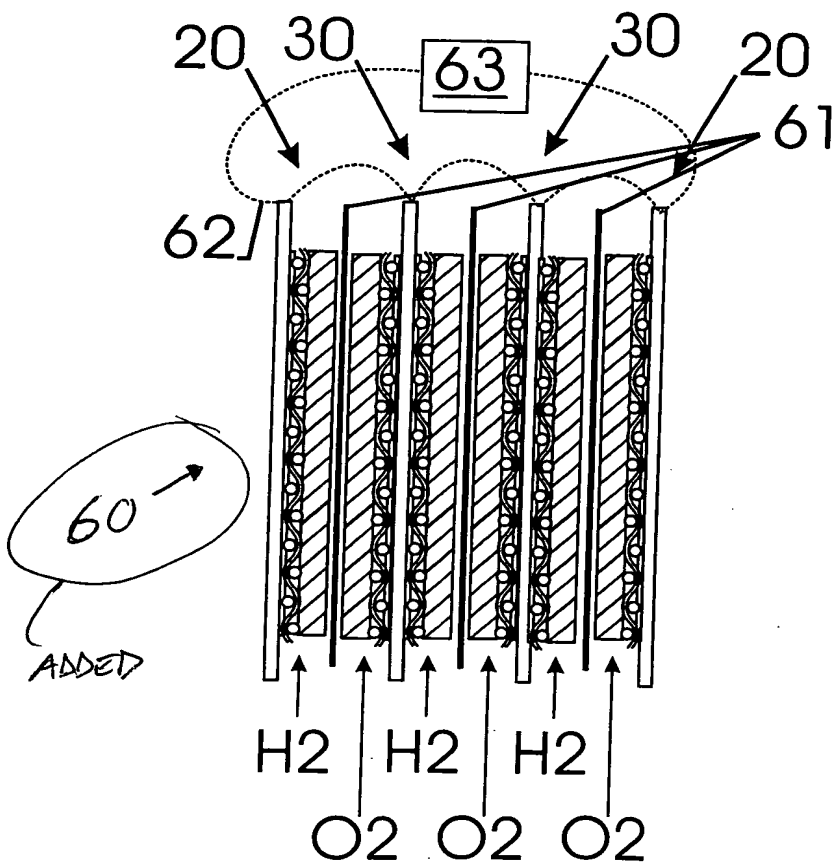


Fig. 6

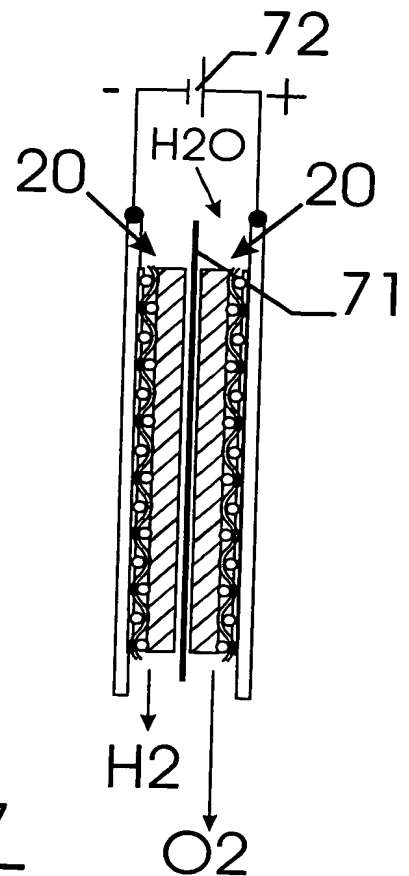


Fig. 7